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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/695,253	10/25/2000	Hang-woo Lee	030681-248	2631

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EXAMINER

SANTIAGO, MARICELI

ART UNIT PAPER NUMBER

2879

DATE MAILED: 11/21/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/695,253

Applicant(s)

LEE ET AL.

Examiner

Mariceli Santiago

Art Unit

2879

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 11 September 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-4 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 October 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. §§ 119 and 120**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
- a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on September 11, 2003 has been entered.

### ***Response to Amendment***

The Amendment, filed on June 11, 2003, has been entered and acknowledged by the Examiner.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 3 and 4 are rejected under 35 U.S.C. 102(b) as being anticipated by Jager (US 6,107,733).

Regarding claims 3 and 4, Jager discloses a triode field emission display (FED) comprising front and rear substrates (6 and 10) disposed to face each other and separated by a predetermined distance, cathode lines (11) formed on the rear substrate in a striped pattern, electrons emitters (2) formed on the cathode lines at regular intervals, anode lines (9r, 9g, 9b) formed on the front substrate in a striped pattern crossing the cathode lines, phosphor (7r, 7g,

7b) formed on the anode lines, and extraction electrodes formed on the front substrate on which the anodes are formed, each extraction electrode being separated from each adjacent anode by a predetermined distance, the extraction electrodes being formed in a striped pattern parallel to the anode lines and upon selective biasing act to extract electrons away from impinging on the phosphor formed on the anode (Column 5, lines 63-67 through Column 6, lines 1-6). Electrons emitted from the electron emitters impinge upon the anode substrate, inclusive the focusing strips (19), Jager discloses "The more the biasing potential of the focusing strips is lower than the minimum biasing potential of the cathode, the more the focusing effect is significant", thus, the focusing strips are considered to induce extraction electrons away from impinging on the phosphor layer, up to some degree, when the biasing potential of the focusing strip is closer to the minimum biasing potential of the cathode.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1 and 2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jager (US 6,107,733) in view of Keesmann et al. (US 5,773,921).

Regarding claims 1 and 2, Jager discloses a triode field emission display (FED) comprising front and rear substrates (6 and 10) disposed to face each other and separated by a predetermined distance, a cathode (11) formed on the rear substrate (10), electron emitters (2) formed on the cathode (11), an anode (9g) formed on the front substrate (6), phosphor (7g) formed on the anode (9g), and an extraction electrode (19) formed on the front substrate (6) on

which the anode is formed, the extraction electrode (6) being separated from the anode (9g) by a predetermined distance and upon selective biasing acts to extract electrons away from impinging on the phosphor formed on the anode (Column 5, lines 63-67 through Column 6, lines 1-6). Electrons emitted from the electron emitters impinge upon the anode substrate, inclusive the focusing strips (19), Jager discloses "The more the biasing potential of the focusing strips is lower than the minimum biasing potential of the cathode, the more the focusing effect is significant", thus, the focusing strips are considered to induce extraction electrons away from impinging on the phosphor layer, up to some degree, when the biasing potential of the focusing strip is closer to the minimum biasing potential of the cathode.

Jager fails to disclose the use of nanotubes as electron emitters formed in the cathode. However, in the same field of endeavor, Keesmann discloses an FED (Column 7, lines 15-20) including carbon nanotubes (31) formed on the cathode lines for providing stable emission (Column 3, lines 35-40). Thus, it would have been obvious at the time the invention was made to a person having ordinary skills in the art to incorporate the carbon nanotubes as disclosed by Keesmann in the display of Jager for the advantage of providing stable emission.

### ***Response to Arguments***

Applicant's arguments filed June 11, 2003 have been fully considered but they are not persuasive.

Applicant's arguments (Pages 5-6) state that the prior art reference (Jager '733) fails to teach or suggest an extraction electrode which upon selective biasing act to extract electrons away from impinging on the phosphor formed on the anode since Jager discloses focusing strips that create a focusing effect for the electrons emitted by the cathode to impinge the phosphor layer and there is no teaching of an extraction of electrons away from the phosphor layer.

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Jager discloses an FED comprising front and rear substrates, cathode lines formed on the rear substrate, electron emitters formed on the cathode lines, anode lines formed on the front substrate, phosphor formed on the anode lines, and extraction electrodes formed on the front substrate, electrons emitted from the electron emitters impinge upon the anode substrate (front substrate), inclusive the focusing strips 19. Jager discloses "The more the biasing potential of the focusing strips is lower than the minimum biasing potential of the cathode, the more the focusing effect is significant", thus, the focusing strips are considered to induce extraction electrons away from impinging on the phosphor layer, up to some degree, when the biasing potential of the focusing strip is closer to the minimum biasing potential of the cathode.

Accordingly, for the above reasons the rejection of claims 1-4 is deemed proper.

#### ***Contact Information***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mariceli Santiago whose telephone number is (703) 305-1083. The examiner can normally be reached on Monday-Friday from 9:00 AM to 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimesh Patel, can be reached on (703) 305-4794. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

*Mariceli Santiago* 11/14/03  
Mariceli Santiago  
Patent Examiner  
Art Unit 2879